

Listing of Claims

What is claimed is:

1. (Original) An implantable medical pump, comprising:

a fluid reservoir;

a passive regulator assembly adjustable to a plurality of flow rate settings for regulating the flow of fluid from the fluid reservoir;

electromechanical control means for changing the passive regulator assembly from a first flow rate setting to a second flow rate setting when the electromechanical control means receives an induced voltage and in response to control signals; and

means for receiving radio frequency signals operative to maintain the induced voltage in the electromechanical control means in response to received radio frequency signals.
2. (Original) The implantable medical pump of claim 1, wherein the means for receiving radio frequency signals is further operative to provide control signals to the electromechanical control means in response to received radio frequency signals.
3. (Original) The implantable medical pump of claim 2, wherein the regulator assembly for regulating the flow of fluid from the fluid reservoir comprises a valve.
4. (Original) The implantable medical pump of claim 2, wherein the regulator assembly for regulating the flow of fluid from the fluid reservoir comprises a valve and a flow restrictor, and wherein the valve is operatively coupled to the flow restrictor.

5. (Original) The implantable medical pump of claim 2, wherein the regulator assembly for regulating the flow of fluid from the fluid reservoir comprises a plurality of valves and a flow restrictor network which are operatively coupled.

6. (Original) The implantable medical pump of claim 2, wherein the radio frequency signals are received from a programmer.

7. (Original) The implantable medical pump of claim 2, further comprising means for sensing, in response to a received radio frequency sense command, the amount of fluid in the fluid reservoir.

8. (Original) The implantable medical pump of claim 7, wherein the sense command is received from a programmer.

9. (Previously Presented) An implantable medical pump, comprising:
a fluid reservoir;
a valve for controlling the flow of fluid from the fluid reservoir;
a plurality of flow restrictors operatively coupled to the valve for providing a plurality of flow rates of the fluid from the fluid reservoir; and
a passive control for changing the flow rate setting of the valve in response to a received external control signal.

10. (Original) The implantable medical pump of claim 9 further comprising a receiver within which a voltage is induced when the receiver is in the presence of the control signal.

11. (Original) The implantable medical pump of claim 10 wherein the control signal is a radio frequency signal.

12. (Original) The implantable medical pump of claim 11 wherein the radio frequency signal is received from a programmer.

13. (Original) The implantable medical pump of claim 9 further comprising a first sensor for measuring the flow rate of the fluid.

14. (Original) The implantable medical pump of claim 13 further comprising a second sensor for measuring the volume of fluid in the fluid reservoir.

15. (Previously Presented) An implantable medical pump, comprising:
a fluid reservoir;
a multi-stable valve having multiple states for providing a plurality of flow rates of fluid from the fluid reservoir;
a flow restrictor operatively coupled to the multi-stable valve for regulating the flow rate of fluid from the fluid reservoir; and
a passive control for changing the flow rate setting of the multi-stable valve in response to a received external control signal.

16. (Original) The implantable medical pump of claim 15 further comprising a receiver within which a voltage is induced when the receiver is in the presence of the control signal.

17. (Original) The implantable medical pump of claim 16 wherein the control signal is a radio frequency signal.

18. (Original) The implantable medical pump of claim 17 wherein the radio frequency signal is received from a programmer.

19. (Original) The implantable medical pump of claim 15 further comprising a first sensor for measuring the flow rate of the fluid.

20. (Original) The implantable medical pump of claim 19 further comprising a second sensor for measuring the volume of fluid in the fluid reservoir.

21. (Original) An implantable medical pump, comprising:
a fluid reservoir;
a plurality of valves for controlling the flow of fluid from the fluid reservoir;
a flow restrictor network operatively coupled to the plurality of valves for providing a plurality of flow rates of the fluid from the fluid reservoir; and
a control for changing the flow rate setting of the plurality of valves in response to a received control signal.

22. (Original) The implantable medical pump of claim 21 further comprising a receiver within which a voltage is induced when the receiver is in the presence of the control signal.

23. (Original) The implantable medical pump of claim 22 wherein the control signal is a radio frequency signal.

24. (Original) The implantable medical pump of claim 23 wherein the radio frequency signal is received from a programmer.

25. (Original) The implantable medical pump of claim 21 further comprising a first sensor for measuring the flow rate of the fluid.

26. (Original) The implantable medical pump of claim 25 further comprising a second sensor for measuring the volume of fluid in the fluid reservoir.

27. (Original) An implantable medical pump, comprising:
a fluid reservoir;
a plurality of valves for controlling the flow of fluid from the fluid reservoir;
a flow restrictor for regulating the flow rate of fluid from the fluid reservoir; and
a control for changing the flow rate setting of the plurality of valves in response to a received control signal.

28. (Original) The implantable medical pump of claim 27 further comprising a receiver within which a voltage is induced when the receiver is in the presence of the control signal.

29. (Original) The implantable medical pump of claim 28 wherein the control signal is a radio frequency signal.

30. (Original) The implantable medical pump of claim 29 wherein the radio frequency signal is received from a programmer.

31. (Original) The implantable medical pump of claim 27 further comprising a first sensor for measuring the flow rate of the fluid.

32. (Original) The implantable medical pump of claim 31 further comprising a second sensor for measuring the volume of fluid in the fluid reservoir.

33. (Previously Presented) The implantable medical pump of claim 9, further comprising a receiver for receiving the control signal via telemetry from an external device, wherein the control signal provides instruction to adjust the flow rate of the fluid from a first flow rate to a second flow rate.

34. (Previously Presented) The implantable medical pump of claim 9, wherein the passive control is powered by the external control signal.

35. (Previously Presented) The implantable medical pump of claim 15, further comprising a receiver for receiving the control signal via telemetry from an external device, wherein the control signal provides instruction to adjust the flow rate of the fluid from a first flow rate to a second flow rate.

36. (Previously Presented) The implantable medical pump of claim 15, wherein the passive control is powered by the external control signal.

37. (Previously Presented) The implantable medical pump of claim 21, further comprising a receiver for receiving the control signal via telemetry from an external device, wherein the control signal provides instruction to adjust the flow rate of the fluid from a first flow rate to a second flow rate.

38. (Previously Presented) The implantable medical pump of claim 21, wherein the passive control is powered by the external control signal.

39. (Previously Presented) The implantable medical pump of claim 27, further comprising a receiver for receiving the control signal via telemetry from an external device, wherein the control signal provides instruction to adjust the flow rate of the fluid from a first flow rate to a second flow rate.

40. (Previously Presented) The implantable medical pump of claim 27, wherein the passive control is powered by the external control signal.

41. (Previously Presented) An implantable medical pump comprising in combination:

- a fluid reservoir;
- a passive regulator assembly for controlling a flow rate of fluid from the fluid reservoir;
- a receiver for receiving a control signal via telemetry from an external device, wherein the control signal provides instruction to adjust the flow rate of the fluid from a first flow rate to a second flow rate; and
- a control responsive to the control signal for adjusting the passive regulator assembly to cause a change in the flow rate.

42. (Previously Presented) The implantable medical pump of claim 41, further comprising an external power source for providing power to various components in the implantable medical pump.

43. (Previously Presented) The implantable medical pump of claim 41, further comprising an external power source for providing power to the implantable medical pump necessary to adjust the flow rate.

44. (Previously Presented) The implantable medical pump of claim 41 wherein the implantable medical pump is a passive device that is capable of delivery of drug to the patient without an internal power supply.

45. (Previously Presented) The implantable medical pump of claim 41 wherein the control is an electromechanical control.

46. (Previously Presented) The implantable medical pump of claim 41 wherein the control is a passive control powered by an external power supply.

47. (Previously Presented) The implantable medical pump of claim 41 wherein the control signal is a radio frequency signal.

48. (Previously Presented) The implantable medical pump of claim 41 wherein the control signal is received from a programmer.

49. (Previously Presented) The implantable medical pump of claim 41 further comprising a first sensor for measuring the flow rate.

50. (Previously Presented) The implantable medical pump of claim 41 further comprising a second sensor for measuring a volume of fluid in the fluid reservoir.

51. (Previously Presented) The implantable medical pump of claim 41 wherein the passive regulator assembly comprises at least one valve.

52. (Previously Presented) The implantable medical pump of claim 51 wherein the valve is a bi-stable valve.

53. (Previously Presented) The implantable medical pump of claim 51 wherein the valve is a multi-stable valve.

54. (Previously Presented) The implantable medical pump of claim 51 wherein the valve is a shape-memory valve.

55. (Previously Presented) The implantable medical pump of claim 51 wherein the valve is a bi-metallic valve.

56. (Previously Presented) The implantable medical pump of claim 51 wherein the valve is a micromachined valve.

57. (Previously Presented) The implantable medical pump of claim 41 wherein the passive regulator assembly comprises at least one restrictor.

58. (Previously Presented) The implantable medical pump of claim 41 wherein the passive regulator assembly comprises at least one restrictor and at least one valve operatively coupled to the restrictor.

59. (Previously Presented) The implantable medical pump of claim 41 wherein the control is an electromechanical control.

60. (Previously Presented) The implantable medical pump of claim 41 wherein the control is an electromechanical control that receives an induced voltage in response to the control signal.